PUBLIC HEALTH ASSESSMENT

PALMER BARGE LINE

PORT ARTHUR, JEFFERSON COUNTY, TEXAS

CERCLIS NO. TXD068104561

Prepared by:

The Texas Department of Health
Under Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

THE ATSDR PUBLIC HEALTH ASSESSMENT: A NOTE OF EXPLANATION

This Public Health Assessment was prepared by ATSDR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) section 104 (i)(6) (42 U.S.C. 9604 (i)(6)), and in accordance with our implementing regulations (42 C.F.R. Part 90). In preparing this document, ATSDR has collected relevant health data, environmental data, and community health concerns from the Environmental Protection Agency (EPA), state and local health and environmental agencies, the community, and potentially responsible parties, where appropriate.

In addition, this document has previously been provided to EPA and the affected states in an initial release, as required by CERCLA section 104 (i)(6)(H) for their information and review. The revised document was released for a 30-day public comment period. Subsequent to the public comment period, ATSDR addressed all public comments and revised or appended the document as appropriate. The public health assessment has now been reissued. This concludes the public health assessment process for this site, unless additional information is obtained by ATSDR which, in the agency's opinion, indicates a need to revise or append the conclusions previously issued.

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FOREWORD

The Agency for Toxic Substances and Disease Registry, ATSDR, was established by Congress in 1980 under the Comprehensive Environmental Response, Compensation, and Liability Act, also known as the *Superfund* law. This law set up a fund to identify and clean up our country's hazardous waste sites. The Environmental Protection Agency, EPA, and the individual states regulate the investigation and clean up of the sites.

Since 1986, ATSDR has been required by law to conduct a public health assessment at each of the sites on the EPA National Priorities List. The aim of these evaluations is to find out if people are being exposed to hazardous substances and, if so, whether that exposure is harmful and should be stopped or reduced. If appropriate, ATSDR also conducts public health assessments when petitioned by concerned individuals. Public health assessments are carried out by environmental and health scientists from ATSDR and from the states with which ATSDR has cooperative agreements. The public health assessment program allows the scientists flexibility in the format or structure of their response to the public health issues at hazardous waste sites. For example, a public health assessment could be one document or it could be a compilation of several health consultations the structure may vary from site to site. Nevertheless, the public health assessment process is not considered complete until the public health issues at the site are addressed.

Exposure: As the first step in the evaluation, ATSDR scientists review environmental data to see how much contamination is at a site, where it is, and how people might come into contact with it. Generally, ATSDR does not collect its own environmental sampling data but reviews information provided by EPA, other government agencies, businesses, and the public. When there is not enough environmental information available, the report will indicate what further sampling data is needed.

Health Effects: If the review of the environmental data shows that people have or could come into contact with hazardous substances, ATSDR scientists evaluate whether or not these contacts may result in harmful effects. ATSDR recognizes that children, because of their play activities and their growing bodies, may be more vulnerable to these effects. As a policy, unless data are available to suggest otherwise, ATSDR considers children to be more sensitive and vulnerable to hazardous substances. Thus, the health impact to the children is considered first when evaluating the health threat to a community. The health impacts to other high risk groups within the community (such as the elderly, chronically ill, and people engaging in high risk practices) also receive special attention during the evaluation.

ATSDR uses existing scientific information, which can include the results of medical, toxicologic and epidemiologic studies and the data collected in disease registries, to determine the health effects that may result from exposures. The science of environmental health is still developing, and sometimes scientific information on the health effects of certain substances is not available. When this is so, the report will suggest what further public health actions are needed.

Conclusions: The report presents conclusions about the public health threat, if any, posed by a site. When health threats have been determined for high risk groups (such as children, elderly, chronically ill, and people engaging in high risk practices), they will be summarized in the conclusion section of the report. Ways to stop or reduce exposure will then be recommended in the public health action plan.

ATSDR is primarily an advisory agency, so usually these reports identify what actions are appropriate to be undertaken by EPA, other responsible parties, or the research or education divisions of ATSDR. However, if there is an urgent health threat, ATSDR can issue a public health advisory warning people of the danger. ATSDR can also authorize health education or pilot studies of health effects, fullscale epidemiology studies, disease registries, surveillance studies or research on specific hazardous substances.

Community: ATSDR also needs to learn what people in the area know about the site and what concerns they may have about its impact on their health. Consequently, throughout the evaluation process, ATSDR actively gathers information and comments from the people who live or work near a site, including residents of the area, civic leaders, health professionals and community groups. To ensure that the report responds to the community's health concerns, an early version is also distributed to the public for their comments. All the comments received from the public are responded to in the final version of the report.

Comments: If, after reading this report, you have questions or comments, we encourage you to send them to us.

Letters should be addressed as follows:

Attention: Chief, Program Evaluation, Records, and Information Services Branch, Agency for Toxic Substances and Disease Registry, 1600 Clifton Road (E56), Atlanta, GA 30333.

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SUMMARY

The Palmer Barge Line site was proposed to the National Priorities List (NPL) on May 11, 2000. This site is located adjacent to the State Marine National Priorities List site 4½ miles northeast of Port Arthur, Jefferson County, Texas. The site encompasses approximately 17 acres of a small peninsula on the northwestern shore of Sabine Lake.

The site was used as a municipal landfill from 1956 until 1982 and was operated by a barge cleaning and maintenance company from 1982 to 1997. Palmer Barge's primary operations consisted of cleaning, maintenance, inspection, and degassing of barges and marine equipment. Operations at the site have resulted in the contamination of surface soil and sediment. The primary contaminants of concern at the site include arsenic, benzo(a)pyrene, pentachlorophenol, heptachlor, bis(2-ethylhexyl)phthalate, and 4, 4'-DDD.

The Texas Department of Health (TDH) and the Agency for Toxic Substances and Disease Registry (ATSDR) evaluated the environmental information available for the site and identified several exposure pathways through which people may come into contact with site contaminants. These exposure pathways include possible contact with site contaminants in the sediment, surface soil, air, surface water, food chain, and groundwater. Exposure to contaminants in these media would not be expected to cause adverse health effects either because the contaminant concentration is too low or contact with the contaminant would be infrequent. Thus, based on available evidence the site does not pose a public health hazard. As per ATSDR guidance, we have categorized this as a "No Apparent Public Health Hazard" site because exposure to contaminants in some of these media is still possible. ATSDR will review any additional information that becomes available and may change the categorization of the Palmer Barge Line site, if warranted.

ATSDR PUBLIC HEALTH CONCLUSION CATEGORIES

CATEGORY A. **URGENT PUBLIC HEALTH HAZARD**[1]	**CATEGORY B.** **PUBLIC HEALTH HAZARD**[1]	**CATEGORY C.** **INDETERMINATE PUBLIC HEALTH HAZARD**	**CATEGORY D.** **NO APPARENT PUBLIC HEALTH HAZARD**[1]	**CATEGORY E.** **NO PUBLIC HEALTH HAZARD**
This category is used for sites where short-term exposures (<1 yr) to hazardous substances or conditions could result in adverse health effects that require rapid intervention.	This category is used for sites that pose a public health hazard due to the existence of long-term exposures(>1 yr) to hazardous substances or conditions that could result in adverse health effects.	This category is used for sites in which "critical" data are *insufficient* with regard to extent of exposure and/or toxicologic properties at estimated exposure levels.	This category is used for sites where human exposure to contaminated media may be occurring, may have occurred in the past, and/or may occur in the future, but the exposure is not expected to cause any adverse health effects.	This category is used for sites that, because of the absence of exposure, do NOT pose a public health hazard.
Criteria: Evaluation of available information[2] indicates that site-specific conditions or likely exposures have had, are having, or are likely to have in the future, an adverse impact on human health and requires immediate action or intervention. Such site-specific conditions or exposures may include the presence of serious physical or safety hazards, such as open mine shafts, poorly stored or maintained flammable/explosive substances, or medical devices which, upon rupture, could release radioactive materials.	**Criteria**: Evaluation of available relevant information[2] suggests that, under site-specific conditions of exposure, long-term exposures to site-specific contaminants (including radionuclides) have had, are having, or are likely to have in the future, an adverse impact on human health that requires one or more public health interventions. Such site-specific exposures may include the presence of serious physical hazards, such as open mine shafts, poorly stored or maintained flammable/explosive substances, or medical devices which, upon rupture, could release radioactive materials.	**Criteria**: The health assessor must determine, using professional judgement, the "criticality" of such data and the likelihood that the data can be obtained and will be obtained in a timely manner. Where some data are available, even limited data, the health assessor is encouraged to the extent possible to select other hazard categories and to support their decision with clear narrative that explains the limits of the data and the rationale for the decision.	**Criteria**: Evaluation of available information[2] indicates that, under site-specific conditions of exposure, exposures to site-specific contaminants in the past, present, or future are not likely to result in any adverse impact on human health.	**Criteria**: Sufficient evidence indicates that no human exposures to contaminated media have occurred, none are now occurring, and none are likely to occur in the future.

[1] This determination represents a professional judgement based on critical data which ATSDR has judged sufficient to support a decision. This does not necessarily imply that the available data are complete; in some cases additional data may be required to confirm or further support the decision made.

[2] Such as environmental and demographic data; health outcome data; exposure data; community health concerns information; toxicologic, medical, and epidemiologic data.

INTRODUCTION

The Agency for Toxic Substances and Disease Registry (ATSDR) was established under the mandate of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980. This act, also known as the "Superfund" law, authorized the U.S. Environmental Protection Agency (EPA) to conduct clean-up activities at hazardous waste sites. EPA was directed to compile a list of sites considered hazardous to public health. This list is termed the National Priorities List (NPL). The 1986 Superfund Amendments and Reauthorization Act (SARA) directed ATSDR to prepare a Public Health Assessment (PHA) for each NPL site. In 1990, federal facilities were included on the NPL. (Note: Appendix A provides a listing of abbreviations and acronyms used in this report.)

In conducting the PHA, three types of information are used: environmental data, community health concerns and health outcome data. The environmental data are reviewed to determine whether people in the community might be exposed to hazardous materials from the NPL facility. If people are being exposed to these chemicals, ATSDR will determine whether the exposure is at levels that might cause harm. Community health concerns are collected to determine whether health concerns expressed by community members could be related to exposure to chemicals released from the NPL facility. If the community raises concerns about specific diseases in the community, health outcome data (information from state and local databases or health care providers) can be used to address the community concerns. Also, if ATSDR finds that harmful exposures have occurred, health outcome data can be used to determine if illnesses are occurring which could be associated with the hazardous chemicals released from the NPL facility.

In accordance with the Interagency Cooperative Agreement between ATSDR and the Texas Department of Health (TDH), ATSDR and TDH have prepared this PHA for the Palmer Barge Line NPL site. This PHA presents conclusions about whether exposures are occurring, and whether a health threat is present. In some cases, it is possible to determine whether exposures occurred in the past; however, often a lack of appropriate historical data makes it difficult to quantify past exposures. If it is found that a threat to public health exists, recommendations are made to stop or reduce the threat to public health.

BACKGROUND

Site Description and History

The Palmer Barge Line National Priorities List site is a former barge cleaning facility located on Old Yacht Club Road, Port Arthur, Jefferson County, Texas. The site is 4½ miles northeast of Port Arthur and encompasses approximately 17 acres of a small peninsula (Figure 2). The facility is bounded on the north by vacant property. The southern portion of the property is bounded by the State Marine (TXD099801102) National Priorities List site. To the west is Old Yacht Club Road and on the eastern boundary is Sabine Lake and the Gulf Intracoastal Waterway. The site is slightly elevated at the western boundary and gradually slopes down toward the east (in the direction of the lake). The confluence of the Neches River and Sabine Lake is approximately ½ mile northeast of the site.

The site was first used as a municipal landfill by the City of Port Arthur from 1956 until 1982. In April 1982, Palmer Barge Line, Inc. purchased the site from the City of Port Arthur and operated until July 1997. Palmer Barge's primary operations consisted of cleaning, maintenance, inspection, and degassing of barges and marine equipment. Cleaning involved the pressure steaming of vessel holds, engines, and boilers to strip or remove sludges and liquids. Low pressure steam was produced by two diesel/mixed fuel boilers. Maintenance and inspection included the repair and/or replacement of engines and valves. Degassing consisted of the removal of explosive vapors from barge holds using nitrogen or boiler exhaust. A flare was used to burn off any excess gasses and liquids which were produced during the operations [1].

In December 1996, the Texas Natural Resource Conservation Commission (TNRCC) Region 10 Field Office conducted a multimedia investigation of the Palmer Barge site to determine the facility's compliance with the Federal Clean Air Act. In March 1998, the TNRCC Region 10 Field Office and EPA Region 6 personnel prepared a Preliminary Assessment/Screening Site Inspection (PA/SSI) for the Palmer site to identify waste source areas. On-site soil and Sabine Lake sediment samples were collected and analyzed. Metals, pesticides, and semi-volatile organic compounds (SVOC's) were detected.

In June 1999, as part of an Expanded Site Inspection (ESI), personnel from the TNRCC Region 10 Field Office and personnel from Roy F. Weston, Inc. conducted a site inspection (reconnaissance). In July of that same year, the TNRCC Region 10 field office sampled above ground storage tanks (AST's), roll off boxes and some of the slop tanks for characterization purposes. An additional site reconnaissance was conducted in August 1999, by TNRCC, Roy F. Weston, Inc. and EPA Region 6 personnel. In October 1999, Weston, Inc. performed sampling of soil, sediment, and groundwater.

As a result of the ESI, the EPA has identified 10 sources of contamination [1] (Figure 1):

Source 1: contaminated soils in the Wastewater AST area.
Source 2: contaminated soils in the Boiler House area.
Source 3: contaminated soils in the Open-Top Slop Tank area.
Source 4: contaminated soils in the Horizontal AST area.
Source 5: contaminated soils in the 12 AST area.
Source 6: contaminated soils in the Flare area
Source 7: contaminated liquids in the wastewater ASTs
Source 8: contaminated liquids in the Boiler House ASTs
Source 9: contaminated liquids in the Horizontal ASTs
Source 10: contaminated liquids in the 12 ASTs

The site was proposed for inclusion on the NPL on May 11, 2000, and was included on the NPL on July 27, 2000.

Demographics

According to the U.S. Census Bureau, in 1990 the total residential population within a one mile radius of the Palmer Barge site was estimated to be 10 people (Figure 2). Although few individuals reside in the area, approximately 400 people work on the peninsula [2]. Currently, the only workers on the site are people involved in the remediation of the site.

The residential neighborhood closest to the Palmer Barge site is approximately 1½ miles northwest of the facility along the west side of State Highway 87. Other nearby residential areas include the City of Groves (estimated population of 16,362 - July 2000) located 4 miles southwest of Palmer Barge, the City of Port Arthur (population 56,574) which is 4½ miles to the southwest, Bridge City (population 8,034) located approximately 5½ miles north of the site, and Port Neches (population 13,981) which is approximately 8 miles west of Palmer Barge [3].

Land Use and Natural Resource Use

Currently there are approximately 11 industrial or commercial businesses on the peninsula within one-mile of the site. These include a retail fuel dealer, a ship/boat builder, a boat repair facility, oil field contractors, industrial building/warehouse contractors, scrap iron and metal dealers, and chemical product wholesalers [2]. There are no parks, recreational beaches, playgrounds, schools, hospitals, day cares, or nursing homes within one-mile of the site [2, 4].

The Palmer Barge site is located on the West Gulf Coastal Plain of the United States. The confluence of the Neches River and Sabine Lake occurs approximately ½ mile north of the site. Adjacent to the eastern boundary of the site is Sabine Lake and the Gulf Intracoastal Waterway. Sabine Lake covers approximately 68 square miles. The lake is considered an estuary and is under coastal tidal influence. Water for the lake is received from the Neches and Sabine rivers and discharged directly into the Gulf of Mexico. The average annual rainfall is 54 inches per year with most occurring from May to

September. The property elevation is higher on the western boundary and gradually slopes toward the east. Surface water runoff is into Sabine Lake at the Palmer Barge bulkhead or dock. The site is also located in the 100-year flood plain [1].

In addition to being used for shipping, Sabine Lake, the Neches River, and the Intracoastal Waterway are used for commercial and recreational fishing. This area is popular because the mixing of freshwater and salt water at the mouth of the Neches River results in a wide variety of both freshwater and salt water fish. Fish and shellfish captured annually from Sabine Lake has been estimated at 650,000 pounds commercially and 20,000 pounds for recreational users [1]. Fishing along the shoreline of the site has been documented by the TNRCC in May 1996 and observed by TDH in August 1998 [2]. No fishing was observed by the TNRCC or TDH during the site visit in February 2001.

Site Visit

TDH personnel visited the Palmer Barge site (Figure 1) on February 7, 2001, along with representatives from the TNRCC. We spent approximately three hours examining the site and the surrounding area. All businesses in the vicinity are industrial and have the use of a public water supply. At the time of the visit, access to the site was not restricted. There was a six-foot tall chain link fence, topped with barbed wire, on the south and west property lines. The gate near the southwest corner of the site was open at the time of our visit. We did not see any fencing on the northern property line and access from the east (Sabine Lake) is unlimited. There was no evidence that children or teenagers were frequenting the area. The weather during the site visit was sunny and warm. We did not see any water ponding or runoff from the site during the visit.

At the site we observed numerous cranes, abandoned equipment, above ground storage tanks (ASTs), a boiler, a flare, an open pit area used during site remediation to neutralize liquid wastes, oil-stained ground, and general waste/debris around the dock area.

ENVIRONMENTAL CONTAMINATION / PATHWAYS ANALYSIS / PUBLIC HEALTH IMPLICATIONS

Introduction

Exposure to, or contact with, chemical contaminants drive the ATSDR public health assessment process. The release or disposal of chemical contaminants into the environment does not always result in exposure or contact. Chemicals only have the potential to cause adverse health effects if people actually come into contact with them. People may be exposed to chemicals by breathing (inhalation), eating or drinking a substance containing the contaminant (ingestion) or by skin (dermal) contact with a substance containing the contaminant.

When people are exposed to chemicals, the exposure does not always result in adverse health effects. The type and severity of health effects that may occur in an individual from contact with contaminants depend on the toxicologic properties of the contaminants; how much of the contaminant to which the individual is exposed; how often and/or how long exposure is allowed to occur; the manner in which the contaminant enters or contacts the body (breathing, eating, drinking, or skin/eye contact); and the number of contaminants to which an individual is exposed (combinations of contaminants). Once exposure occurs, characteristics such as age, sex, nutritional status, genetics, life style, and health status of the exposed individual influence how the individual absorbs, distributes, metabolizes, and excretes the contaminant. These factors and characteristics influence whether exposure to a contaminant could or would result in adverse health effects.

As a preliminary step in assessing the potential health risks associated with contaminants at this site, we compared contaminant concentrations to health assessment comparison (HAC) values. HAC values are media-specific contaminant concentrations that are used to screen contaminants for further evaluation. Non-cancer HAC values are called environmental media evaluation guides (EMEGs) or reference dose media evaluation guides (RMEGs), and are respectively based on ATSDR's minimal risk levels (MRLs) or EPA's reference doses (RfDs). MRLs and RfDs are estimates of a daily human exposure to a contaminant that is unlikely to cause adverse non-cancer health effects. Cancer risk evaluation guides (CREGs) are based on EPA's chemical specific cancer slope factors and an estimated excess lifetime cancer risk of one-in-one-million persons exposed for a lifetime. We used standard assumptions to calculate appropriate HAC values [5].

In some instances where water was involved, we compared contaminant concentrations in water to EPA's maximum contaminant levels (MCLs). MCLs are chemical-specific maximum concentrations allowed in water delivered to the users of a public water system; they are considered protective of public health over a lifetime (70 years) of exposure at an ingestion rate of two liters per day. MCLs may be based on available technology and economic feasibility. Although MCLs only apply to public water supply systems, we often use them to help assess the public health implications of contaminants found in water from other sources.

While exceeding a HAC value does not necessarily mean that a contaminant represents a public health threat, it does suggest that the contaminant warrants further consideration. The public health significance of contaminants that exceed HAC values may be assessed by reviewing and integrating relevant toxicological information with plausible exposure situations. Estimated exposures may be compared to reported "No Observable" and "Lowest Observable" Adverse Effects Levels (NOAELs and LOAELs) and to known effect levels in humans, when available.

Environmental Contamination

Sediment, soil, and groundwater samples considered in this evaluation were collected in October 1999. In reviewing these data, we relied on the information provided in the referenced documents and assumed that adequate Quality Assurance/Quality Control (QA/QC) measures were followed with regard to chain-of-custody, laboratory procedures, and data reporting.

Samples were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, and polychlorinated biphenyls (PCBs) by Ecology & Environment. The analysis for inorganic compounds was performed by Sentinel, Inc. [4]. HAC values were used to screen contaminants for further consideration (Appendix C, Tables 2 through 4). Contaminants found at concentrations below HAC values are not included in the tables. Inclusion of a contaminant in the tables or the fact that a contaminant exceeds a comparison value does not imply that a contaminant represents a threat to public health, but it is an indicator that the contaminant warrants further evaluation.

Exposure Pathways

In this section we evaluated the possible pathways for exposure to contamination at the Palmer Barge site. We examined these possible exposure pathways to determine whether people near or working at the site can be exposed to (or come into contact with) contaminants from the site. Exposure pathways consist of five elements: 1) a source of contamination; 2) transport through an environmental medium; 3) a point of exposure; 4) a plausible manner (route) for the contaminant to get into the body; and, 5) an identifiable receptor population. Exposure pathways are categorized as completed, potential, or eliminated pathways.

For a person to be exposed to a contaminant, the exposure pathway must be completed. An exposure pathway is considered completed when all five elements in the pathway are present and exposure has occurred, is occurring, or will plausibly occur in the future. A potential pathway is missing at least one of the five elements, but may be considered completed in the future as more data become available or site conditions change. Eliminated pathways are missing one or more of the five elements and will never be completed. The exposure pathways considered in our evaluation of this site are summarized in Table 1.

Table 1.

Evaluation of Exposure Pathways
Palmer Barge Line - Port Arthur, Texas

Pathway Name	Contaminants of Concern	Source	Transport Media	Point of Exposure	Route of Exposure	Exposed Population	Time	Comments
Sediment (potential)	Arsenic	Site operations	Sediment	Off site	Incidental ingestion, dermal contact	People wading or swimming in Sabine Lake	Past Present Future	**No apparent public health hazard.** It is unlikely that people would be exposed to contaminants in the sediment at sufficient concentrations often enough to present a health concern.
Surface Soil (past complete) (present eliminated)	Benzo(a)pyrene Pentachlorophenol Heptachlor Arsenic Bis(2-ethylhexyl)-phthalate	Site operations	Soil	On site	Incidental ingestion, dermal contact	Trespassers, workers	Past Present	**No apparent public health hazard.** It is unlikely that people would be exposed to contaminants in the soil at sufficient concentrations often enough to present a health concern.
Surface Water (incomplete)	No data	Site operations	Surface water, site run-off	Off site	Incidental ingestion, dermal contact	People wading, swimming, or fishing in Sabine Lake	Past Present Future	**No apparent public health hazard.** It is unlikely that people would be exposed to contaminants in the surface water at sufficient concentrations often enough to present a health concern.
Air (incomplete)	No data	Site operations	Air	On site	Inhalation	Trespassers, Workers	Present	**No public health hazard.** The site is no longer operating and the source areas have been contained, exposure to contaminants in the air at sufficient concentrations to result in adverse health conditions is not likely.
Foodchain (eliminated)	None Identified	Site operations, spills	Fish, crabs, shrimp, oysters, clams mussels	Off site area around and downstream of facility	Ingestion	Commercial and recreational harvesting of fish/shellfish in the lake area and downstream of site	Past Present Future	**No public health hazard.** Historic data collected by the TDH did not find contaminants in the seafood at concentrations high enough to pose a health hazard.
Groundwater (eliminated)	Arsenic, 4, 4'-DDD	Site operations, spills	Groundwater	None identified	None identified	None identified	Past Present Future	**No public health hazard.** Based on available information there is no evidence of exposure.

Evaluation of Possible Sediment Exposure Pathways

Summary: Exposure to contaminants found in the sediment at this site would not be expected to result in adverse health effects. Although access to the sediment is not restricted, we do not consider exposure to site contaminants in sediment either through ingestion or dermal contact, to be a significant exposure pathway since: 1) the probability of ingesting contaminated sediment is low, 2) the frequency and duration of any contact with contaminated sediment would be low, and 3) the surface area of the skin that would be likely to contact the sediment would probably be small.

Sediment samples were collected in October 1999 from Sabine Lake to identify the presence of any site-related contaminants. Twenty-two samples were collected from the lake in a boat using a sediment sampling device. Seventeen of the sediment samples collected were adjacent to the site. Because a barge was moored at the dock during the sampling period, samples could only be collected at the north and south ends of the dock. Five background sediment samples were collected from the southeast side of Stewts Island, an island located approximately 4,000 to 5,000 feet northeast of the Palmer Barge site. This portion of Sabine Lake does not receive any runoff from the Palmer site [1].

Arsenic was detected in all seventeen samples at concentrations ranging from 2.5 mg/kg (milligrams per kilograms) to 12.3 mg/kg. Although these concentrations are above the carcinogenic risk screening value (Appendix C, Table 2), they are within the normal background levels found in the eastern United States [6]. Since this is not an area where people would be likely to walk without shoes or boots, we do not consider dermal contact to be an important route of exposure. Chronic ingestion (100 milligrams per day for a lifetime) of sediment containing the maximum reported value of 12.3 mg/kg arsenic would result in no apparent increased lifetime risk for cancer. Since the probability of a person regularly ingesting sediment from this area is extremely remote, and the average levels to which a person might be exposed would be lower, the actual risks would be lower. Based on available information, exposures are not at levels expected to cause adverse health effects.

Evaluation of Possible Surface Soil Exposure Pathways

Summary: Exposure to contaminants found in the soil at this site would not be expected to result in adverse health effects. Although access to the site is not restricted, we do not consider exposure to contaminants in the soil either through ingestion or dermal contact to be a significant exposure pathway since: 1) the number of people accessing the site is limited, 2) the probability of regularly ingesting contaminated soil is low, 3) the frequency and duration of any contact with contaminated soil would likely be low, and 4) the surface area of skin likely to come into regular contact with contaminated soil is likely to be small.

Soil at the Palmer Barge site is considered to be fill material and is primarily a result of dredging operations conducted from Sabine Lake and the Intracoastal Waterway [4]. The soil at the site is

not considered suitable for cultivation [1]. Soil sampling was conducted using a Geoprobe® and hand auger in October 1999. Samples were collected at 0 to 2 feet below ground surface and 2 to 4 feet below ground surface. Background soil samples were collected near the northwest corner of the property, the furthest location from where site operations occurred. Benzo(a)pyrene, pentachlorophenol, heptachlor, arsenic, and bis(2-ethylhexyl)phthalate each exceeded their respective carcinogenic risk screening values (Appendix C, Table 3). Arsenic, antimony, lead, and pentachlorophenol exceeded their non-cancer screening values for children, but because it is not likely that children would regularly come into contact with soil from this site, these contaminants were excluded from further consideration with respect to non-cancer effects.

In the past, on-site workers and trespassers could have come in contact with contaminated soil. Using a reasonable maximum exposure scenario for workers, we estimate that there would be no apparent increased lifetime risk for cancer. The worker exposure scenario involved the ingestion of 50 milligrams of soil containing the maximum reported concentration, if only one sample was available, or the average concentration detected in the 0-2' samples if multiple samples were available. We assumed that exposure would occur 250 days per year for 30 years. Based on available information, exposures are not at levels expected to cause adverse health effects.

Evaluation of Possible Surface Water Exposure Pathway

Summary: Although surface water sampling data were not available, we estimate that the possible presence of contaminants in the surface water would not be expected to cause adverse health effects because: 1) the probability of regularly ingesting surface water is low, 2) the frequency and duration of any contact with surface water is likely to be low, and 3) the surface area of the skin that would regularly be in contact with the water would be small.

Surface water in the vicinity of Palmer Barge is brackish and therefore not potable. No public drinking water intakes are located within 15 miles downstream of the site [4]. Businesses on the peninsula get drinking water from the City of Port Arthur municipal water supply. The city draws its water from the Neches River approximately 15 miles upstream from the Palmer Barge site. The surface water is conveyed through a canal system to a municipal water treatment plant. The plant is located approximately 8 miles southwest of the Palmer Barge site [7].

Following a rainfall, surface water run-off will flow from the western portion of the site into Sabine Lake at the bulkhead or dock [4].

Although surface water sampling data for the lake was not available for review, swimming and other recreational activities in the vicinity of the Palmer Barge site are not likely due to ship traffic. While fishing from boats does occur near the site, actual exposure to contaminants through dermal contact or incidental ingestion during these activities would be limited. Since it is unlikely that people would be exposed to contaminants in the water often enough at sufficient concentrations to be a health concern, based on available information, exposures are not at levels expected to cause adverse health effects.

Evaluation of Possible Air Exposure Pathway

Summary: At present, exposure to contaminants through inhalation does not pose a public health hazard. Although information pertaining to contaminant concentrations in the air is not available, currently the site is not operating and possible source areas are being contained. Because of the lack of historic ambient air data, past exposure to contaminants in the air is considered to be an indeterminate public health hazard.

Air sampling data and historical air releases from the Palmer Barge facility were not available for review. Volatilization of chemicals at the Palmer Barge site in the AST's, Open-Top Slop tanks, chemical overflows and spills could have occurred during the time the facility was operating. The potentially exposed population would have consisted of on-site workers. Due to the lack of historical air sampling data, we could not assess the potential public health significance of past exposure through the air. Currently, the site is not operating and source areas are being contained. Thus, on-site remedial workers would be the only population potentially at risk from current exposure to contaminants in the air. Although air data were not available for review, remedial workers following an approved site safety plan should not be at risk. Because the site is no longer operating and source areas are being contained, we have concluded that the air pathway currently does not pose a public health hazard.

Evaluation of Possible Food Chain Exposure Pathway

Summary: Exposure to site contaminants through the ingestion of seafood does not pose a public health hazard. The TDH Seafood Safety Division has been sampling seafood from Sabine Lake since the 1970s. Based on the results of the most recent sampling events conducted in 1994 the TDH Seafood Safety Division did not find reason to issue a fish consumption advisory for this area.

Sabine Lake, a fishery for both commercial and recreational users, in the vicinity of the Palmer Barge site, is heavily fished. Fish are caught both for sport and human consumption. The types of fish caught include flounder, black drum, and sheepshead. Crustaceans such as blue crabs and brown, pink, and white shrimp also are taken.

Since 1985, the commercial harvesting of molluscan shellfish (oysters, clams, and mussels) in Sabine Lake has been prohibited by the Texas Department of Health [8]. The most recent order prohibiting shellfish harvesting was issued by the TDH on November 1, 2000 [9]. The closure is not due to chemical contaminants but to differences between the states of Texas and Louisiana in the determination and classification of molluscan shellfish growing areas in Sabine Lake [10].

The Texas Department of Health Seafood Safety Division has been periodically collecting fish and shellfish samples from Sabine Lake since 1970 [11]. The most recent finfish sampling occurred in 1994 when samples were analyzed for VOCs, semi-VOCs, metals, pesticides, and dioxins. These samples were unremarkable and did not result in the issuance of any fish

consumption advisories. Based on the historic fish sampling data collected by the TDH, we have concluded that this pathway does not pose a public health hazard.

Evaluation of Possible Groundwater Exposure Pathway

Summary: Contaminants found in the groundwater beneath this site do not pose a public health hazard because the groundwater is not used for drinking or other potable purposes. Businesses and residents on the peninsula obtain their drinking water from the City of Port Arthur municipal water supply.

The principal groundwater source in the area of the Palmer Barge site is the Gulf Coast Aquifer. The water quality of this aquifer is fresh to saline and contains less than 1,000 mg/L (milligrams per liter) of total dissolved solids. Within a four-mile radius of the site, the groundwater ranges from two to 60 feet in depth. The shallowest on-site water bearing zone is estimated to be four feet below the ground surface. Direction of groundwater flow was not determined [4].

Groundwater within one mile of the Palmer Barge site is not used for drinking or other potable uses. The nearest domestic well is located approximately one mile from the site and there are 33 private, public, and industrial wells within a four-mile radius of the site [4]. Businesses on the peninsula get their drinking water from the City of Port Arthur municipal water supply [2]. On September 21, 1998, TDH staff conducted a door-to-door survey of two households and eleven businesses on the peninsula in the vicinity of the site. All reported using municipal or bottled water for drinking and other potable purposes. No one reported using or having a water well.

No monitoring wells are installed on the site. Groundwater samples were collected 8 to 10 feet below ground surface from borings. Two samples were collected on the eastern portion of the site near the wastewater ASTs and the twelve ASTs. One background sample was collected from the northwestern portion of the property.

Arsenic and 4,4'-DDD were found at concentrations above their respective carcinogenic risk screening values (Appendix C; Table 4). Arsenic, barium, chromium, iron, lead, manganese, and vanadium were found at concentrations above their respective non-cancer screening values. Since no one is consuming groundwater from wells near the site, this is an incomplete exposure pathway. Since there is no human exposure, any groundwater contamination at the Palmer Barge site would not pose a public health hazard.

COMMUNITY HEALTH CONCERNS / HEALTH OUTCOME DATA

Community Health Concerns Evaluation

As part of the public health assessment process, ATSDR and TDH try to learn what concerns people in the area may have about the impact of the site on their health. Consequently, attempts were made to actively gather information and comments from people who live or work near the site. To collect community health concerns related to the Palmer Barge site, we contacted several different agencies and individuals by telephone. These agencies included the regional offices of both the Texas Department of Health (TDH Region 6/5 South), the Texas Natural Resource Conservation Commission (TNRCC Region 10), and the Environmental Protection Agency (EPA Region 6). In addition to state and federal agencies, we contacted local health department staff and local citizens. No health concerns were identified relating to the Palmer Barge site.

Health Outcome Data Evaluation

Health outcome data (HOD) record certain health conditions that occur in populations. These data can provide information on the general health of communities living near a hazardous waste site. They also can provide information on patterns of specified health conditions. Some examples of health outcome databases are tumor registries, birth defects registries, and vital statistics. Information from local hospitals and other health care providers also may be used to investigate patterns of disease in a specific population. TDH and ATSDR look at appropriate and available health outcome data when there is a completed exposure pathway or community concern. Due to a lack of adequate exposure information on possible past completed exposure pathways, the relative small size of the potentially exposed population, and no identified community health concerns at this time, we did not review health outcome data for this site.

Child Health Initiative

ATSDR's Child Health Initiative recognizes that the unique vulnerabilities of infants and children demand special emphasis in communities faced with contamination of their water, soil, air, or food. Children are at greater risk than adults from certain kinds of exposures to hazardous substances emitted from waste sites and emergency events. They are more likely to be exposed because they play outdoors and they often bring food into contaminated areas. They are shorter than adults, which means they breathe dust, soil, and heavy vapors close to the ground. Children are also smaller, resulting in higher doses of chemical exposure per body weight. The developing body systems of children can sustain permanent damage if toxic exposures occur during critical growth stages. Most importantly, children depend completely on adults for risk identification and management decisions, housing decision, and access to medical care.

We evaluated the likelihood for children living in the vicinity of the Palmer Barge site to be exposed to site contaminants at levels of health concern and determined that it is unlikely that children would regularly be exposed to site-related contaminants.

CONCLUSIONS

1. Although site-related contaminants have been detected in various environmental media, currently there are no identifiable situations where exposure to site contaminants is occurring at levels that would be associated with adverse health effects. This is either because contaminant concentrations are not great enough to be a public health hazard, because exposure to contaminated media would be infrequent, or because contaminated media are not accessible for contact. Based on available information, exposures are not at levels expected to cause adverse health effects. As per ATSDR guidance, since exposure to contaminants in some of these media is still possible, we have categorized this as a "No Apparent Public Health Hazard" site.

2. In addition to the chemical contaminants, the site does have some physical hazards associated with an abandoned industrial business. Although the site is located in an area that the general public is not likely to frequent, it is still accessible to trespassers.

PUBLIC HEALTH ACTION PLAN

Actions Recommended

1. Completely fence the site and post danger signs.

3. Allow only authorized personnel access to the site.

Actions Planned

1. EPA will conduct a remedial investigation and feasibility study (RI/FS) of the site. The RI/FS is tentatively scheduled to start in the Summer of 2001 [12].

2. TDH will review any additional environmental sampling results as they become available.

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CERTIFICATION

This Palmer Barge Line Public Health Assessment was prepared by the Texas Department of Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health assessment was initiated.

Technical Project Officer, SPS, SSAB, DHAC, ATSDR

The Division of Health Assessment and Consultation, ATSDR, has reviewed this public health assessment and concurs with its findings.

Chief, State Programs Section, SSAB, DHAC, ATSDR

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2. Public Health Assessment for State Marine of Port Arthur. Port Arthur, Jefferson County, Texas. CERCLIS No. TXD099801102. U.S. Department of Health and Human Services, Public Health Service. Agency for Toxic Substances and Disease Registry. July 30, 1999.

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4. Expanded Site Inspection Report. Palmer Barge Line Site. Port Arthur, Jefferson County, Texas. CERCLA ID No. TXD068104561 Prepared by Roy F. Weston, Inc. for the U. S. Environmental Protection Agency, Region 6. January 2000.

5. ATSDR Public Health Assessment Guidance Manual. 1993.

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7. Texas Department of Health Record of Communication with Clyde Trahan, Port Water Utilities. March 19, 2002.

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9. Texas Department of Health. Seafood Safety Division. Classification of Shellfish Harvesting Areas of Sabine Lake. November 1, 2000. Order Number MR-795.

10. Texas Department of Health Record of Communication with Gary Heideman, TDH Seafood Safety Division. April 26, 2001.

11. Fish Tissue Sampling Data 1970 - 1997. Texas Department of Health. Seafood Safety Division.

12. Superfund Site Status Summaries - Texas. www.epa.gov/earth1r6/6sf/6sf-tx.htm EPA Publication Date: April 9, 2001.

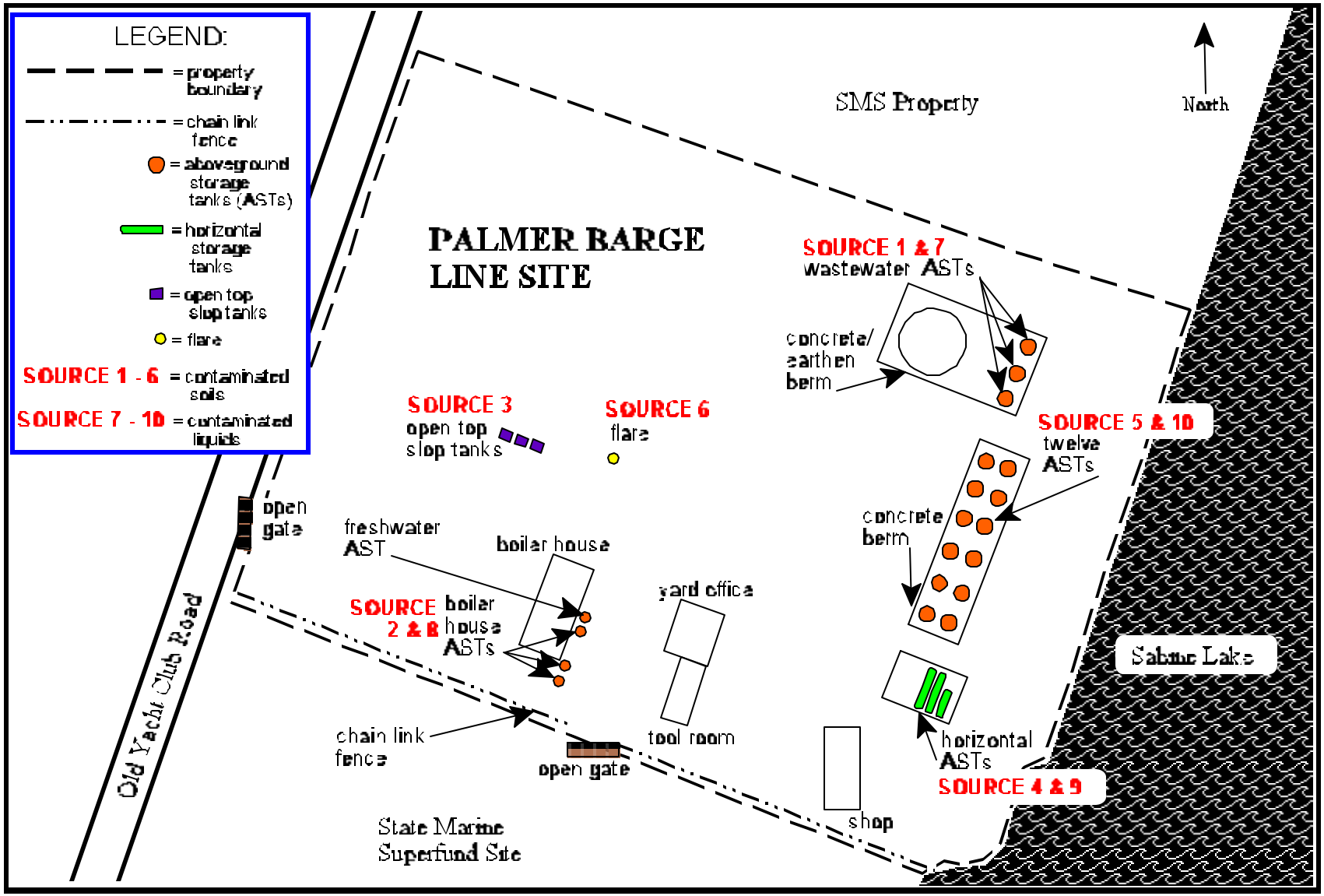
APPENDICES

APPENDIX A - Acronyms and Abbreviations

ASTs	Above ground Storage Tanks
ATSDR	Agency for Toxic Substances and Disease Registry
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CREG	Carcinogenic Risk Evaluation Guide
EMEG	Environmental Media Evaluation Guide
EPA	Environmental Protection Agency
ESI	Expanded Site Inspection
HAC Value	Health Assessment Comparison Value
HOD	Health Outcome Data
HRS	Hazard Ranking System
LOAEL	Lowest Observable Adverse Effects Level
MCL	Maximum Contaminant Level
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MRL	Minimal Risk Level
NOAEL	No Observable Adverse Effects Level
NPL	National Priorities List
PA/SSI	Preliminary Assessment/Screening Site Inspection
PCBs	Polychlorinated biphenyls
PHA	Public Health Assessment
QA/QC	Quality Assurance/Quality Control
RfD	Reference Dose
RI/FS	Remedial Investigation and Feasibility Study
RMEG	Reference Dose Media Evaluation Guide
SARA	Superfund Amendments and Reauthorization Act of 1986
SVOCs	Semi-Volatile Organic Compounds
TDH	Texas Department of Health
TNRCC	Texas Natural Resource Conservation Commission
TPWD	Texas Parks and Wildlife Department
VOCs	Volatile Organic Compounds

APPENDIX B - Figures

Figure 1: On Site Contamination Sources



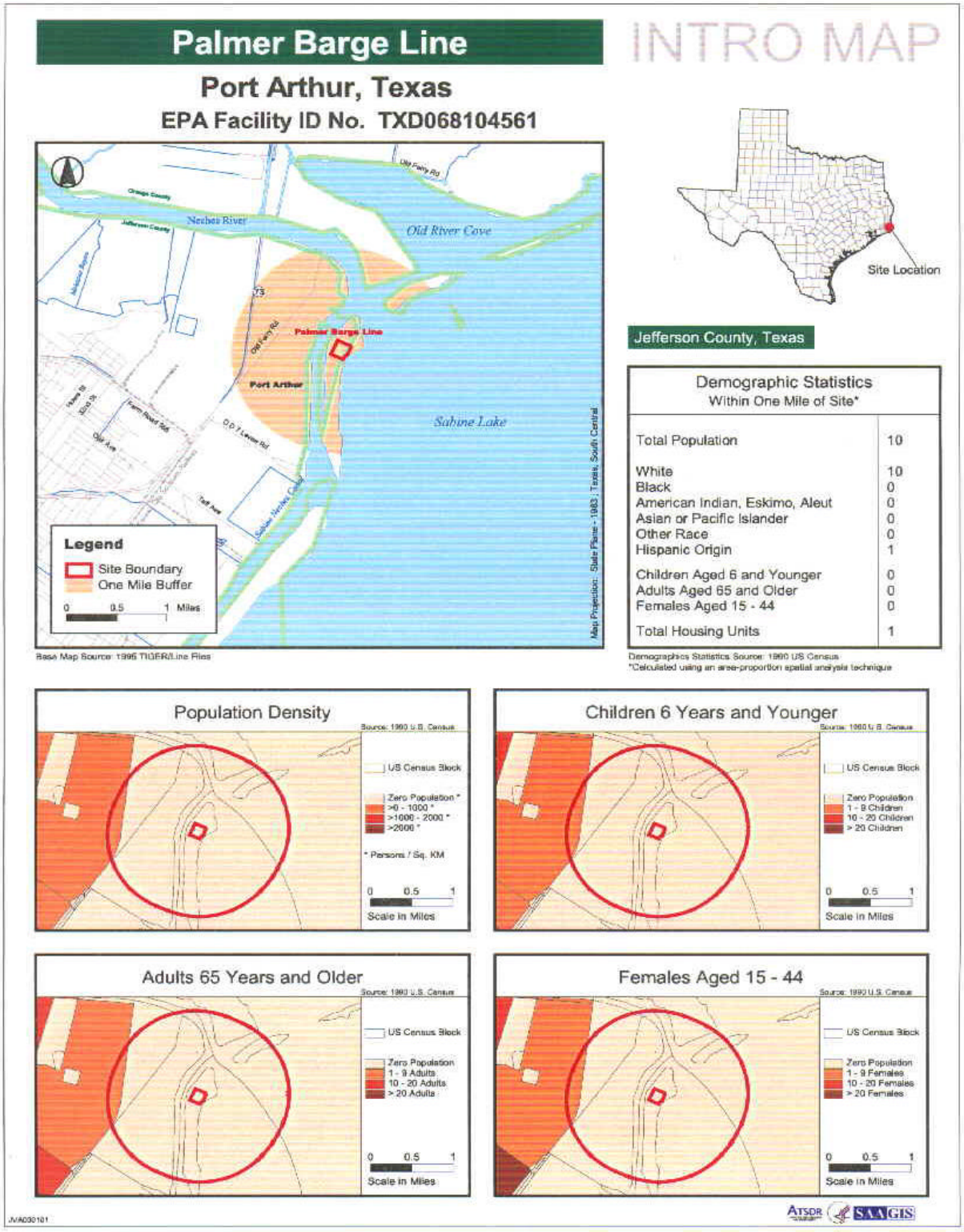


Figure 2: General Site Location and Demographic Information

APPENDIX C – Tables

Table 2 - Sediment Sampling

Palmer Barge Line Company NPL Site

October 1999

Constituents exceeding Health Assessment Comparison (HAC) value

Constituent	# detected per total # samples	Range (mg/kg)	HAC Value (mg/kg)
Arsenic	17/17	2.5 L - 12.3	0.5 CREG 20 child / 200 adult - chronic EMEG & RMEG

L - reported concentration is below the Contract Required Quantitation Limit

Table 3 - Soil Sampling
Palmer Barge Line Company NPL Site - October 1999
Constituents exceeding Health Assessment Comparison (HAC) value

Constituent	Sample Depth (feet)	# detected per total # samples	Range (mg/kg)	HAC value (mg/kg)
Wastewater AST Area				
Benzo(a)pyrene	0N to 2N	2/6	n.d. - 0.38 J	0.1 CREG
	2N to 4N	1/6	n.d. - 240 J	
Pentachlorophenol	0N to 2N	2/6	n.d. - 200	6 CREG 50 child / 700 adult - chronic EMEG & intermediate EMEG 2000 child / 20000 adult - RMEG
	2N to 4N	1/6	n.d. - 570 J	
Lead	0N to 2N	6/6	10.6 - 425	400 - EPA Soil Lead Hazard
	2N to 4N	6/6	5 - 1980	
Heptachlor	0N to 2N	2/6	n.d. - 1.0	0.2 CREG 30 child / 400 adult - RMEG
	2N to 4N	0/6	n.d.	
Boiler House ASTs				
Benzo(a)pyrene	0N to 2N	2/6	n.d. - 0.36	0.1 CREG
	2N to 4N	1/2	n.d. - 0.28	
Antimony	0N to 2N	5/6	n.d. - 36.7 Jv	20 child / 300 adult - RMEG
	2N to 4N	2/2	n.d. - 13.7 LJv	
Arsenic	0N to 2N	6/6	3.8 - 86.5	0.5 CREG 20 child / 200 adult - chronic EMEG & RMEG
	2N to 4N	2/2	6.9 - 43 J	
Lead	0N to 2N	6/6	72.7 - 5050	400 - EPA Residential Soil Lead Hazard for children
	2N to 4N	2/2	27.8 - 1530 J	
Open Top Slop Tanks				
Benzo(a)pyrene	0N-2N	3/4	0.12 LJ - 46 LJ	0.1 CREG
Horizontal ASTs				
bis(2-ethylhexyl)phthalate	0N-2N	2/4	0.14 LJ - 74	50 CREG 500 child / 7000 - adult intermediate EMEG
Twelve ASTs				
Arsenic	0N to 2N	6/6	3.8 - 19.6	0.5 CREG 20 child / 200 adult - chronic EMEG & RMEG
	2N to 4N	0	n.d.	
Lead	0N to 2N	6/6	24.8 - 3450	400 EPA Residential Soil Lead Hazard for children
	2N to 4N	0	n.d.	

J - Estimated value. n.d. - not detected

Jv - Estimated value and low biased. Actual concentration may be higher than the concentration reported.

LJ - Reported concentration is between the Instrument Detection Limit and the Contract Required Detection Limit.

Ljv- Reported concentration is between the Instrument Detection Limit and the Contract Required Detection Limit. Estimated value and low biased.

Table 4 - Groundwater Sampling
Palmer Barge Line Company NPL Site
October 1999
Constituents exceeding Health Assessment Comparison (HAC) value

Constituent	# detected per total # samples	Range (µg/L)	HAC Value (µg/L)
Arsenic	1/2	n.d. - 45.5 J	0.2 CREG 3 child / 10 adult - chronic EMEG & RMEG 50 MCL - National Primary Drinking Water Standard
Barium	2/2	1490 Jv - 1580 Jv	700 child / 2000 adult - RMEG 2000 MCL & LTHA
Chromium	1/2	n.d. - 69.7 J	30 child / 100 adult - RMEG
Iron	2/2	53400 J - 102000 Jv	300 - National Secondary Drinking Water Standard
Lead	1/2	n.d. - 1000 J	15 - National Primary Drinking Water Standard
Manganese	2/2	700 Jv - 12200 Jv	500 child / 2000 adult RMEG
Vanadium	1/2	n.d. - 42 L	30 child / 100 adult - intermediate EMEG
4,4N-DDD	1/2	n.d. - 0.14 J	0.1 CREG

n.d. - not detected
J - estimated value
Jv - Estimated value and low biased. Actual concentration may be higher than the concentration reported.
L - reported concentration is below the Contract Required Quantitation Limit

APPENDIX D – Public Comments Received and Responses

Comments were received from two individuals during the public comment period for the Palmer Barge Line Public Health Assessment.

Commentor #1 stated, **"... include a recommendation for fencing of the site completely, posting danger signs around the site, and limiting access to remediation personnel only."**

[*RESPONSE*] *Recommendations from Commentor #1 are included in the Public Health Action Plan.*

Commentor #2 stated, **"Why was there no testing for mercury?"**

[*RESPONSE*] *Groundwater, sediment and soil samples were tested for mercury. Some groundwater and soil samples had levels of mercury which were above background concentration. Sediment samples were not above background concentration. None of these samples exceeded the Agency for Toxic Substances Disease Registry (ATSDR) health comparison value for mercury.*

"Why are wells within four miles of Palmer Barge Line discussed in terms of groundwater contamination, while neither the canal nor the treatment plant are considered?"

[*RESPONSE*] *Groundwater contamination is discussed as it is a potential transport media for which human exposure to chemical contaminants could occur. At the present time no human exposure to potential groundwater contamination is occurring.*

Water from Sabine Lake, on which the Palmer Barge Line site is located, is not used for drinking water purposes. The city of Port Arthur water supply is obtained from the Neches River, north of Beaumont, Texas. The surface water intakes are located approximately 15 miles upstream (northwest) from the Palmer Barge Line site.

The Lower Neches Valley Authority (LVNA) canal system conveys surface water from the river to the City of Port Arthur water treatment plant. The LVNA canal system ends approximately 3 miles west of Sabine Lake and is approximately 8 miles southwest of the Palmer Barge Line site. The water treatment plant is also the same approximate distances from the lake and the site. The canal system and the water treatment plant are not considered as a potential exposure point for contamination from the Palmer Barge site.

"Was the finfish sampling done in close proximity to the Palmer Barge Line?"

[*RESPONSE*] *Finfish samples were collected from Sabine Lake near the southwestern portion of Stewts Island. This island is located approximately 3,500 to 4,000 feet northeast of the Palmer Barge Line site. Additional samples were collected from areas further south of the site. Reference to Texas Department of Health, Fish Tissue Sampling Data 1970 - 1997, Seafood Safety Division has been cited in the Public Health Assessment.*

"Did finfish testing include mercury, lead, arsenic or any other contaminant found in the samples from the Palmer Barge Line?"

[*RESPONSE*] *Finfish samples included testing for metals such as arsenic, lead, and mercury. The samples were also tested for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs).*

"What about shellfish specifically from the Palmer Barge Line area of Sabine Lake?"

[*RESPONSE*] *The most recent shellfish sampling in the area of Palmer Barge Line occurred on June 8, 1994. Shellfish chemical analysis included testing for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), and metals.*

"Were the samples from the nearby sediment of Sabine Lake tested for anything besides Arsenic?"

[*RESPONSE*] *Sediment samples were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), and metals. Arsenic was the only constituent in the sediment samples which exceeded its carcinogenic risk screening value.*

"What about sediment from the portion of Sabine Lake where surface water runs off?"

[*RESPONSE*] *At the time of the sediment sampling, October 1999, a barge was moored at the site. Sediment samples were collected from Sabine Lake at the northern and southern ends of the dock. Surface water runoff would have entered the lake at the sediment sampling points.*